

# AVIATION WEEK

A McGRAW-HILL PUBLICATION

MARCH 20, 1950

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# SIKORSKY Helicopter NEWS

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Now, just ten years later, the newest and largest of a long line of successful Sikorsky helicopters has completed its flight tests and is now in production. Designated the H-17 for the Air Force, this latest helicopter can carry ten passengers (or eight litter patients) plus a crew of two.

In addition to the traditional Sikorsky ruggedness, it combines many important advances in helicopter performance, dependability, maintenance and ease of handling on the ground and in the air.

Known commercially as the S-55, the craft has a top speed of well over 100 miles per hour and a service ceiling of about 13,000 feet. With auxiliary tanks, it has a ferry range of approximately 1,000 miles.

Constant pioneering in research and development work brought this latest helicopter to the production line at Sikorsky Aircraft. And this is still only the beginning. The pioneering goes on and on.

SIKORSKY AIRCRAFT

Bridgeport, Connecticut

## WHO'S WHERE

### Changes

► **New Appointments**-Henderson Standard division changes. John F. Brattin and James E. Shultz have been appointed vice presidents of Henderson Standard Service Corp. at Detroit and Washington. E. G. respectively. W. F. Clapp will cover Baltimore and Meganticana, Que. T. C. Fisher, a senior test rep, is being transferred as supervisor of field service. A. H. Thaddeus, Jr. is being transferred to the New York office. E. B. Stroh is being transferred to Henderson Standard's sales department from the engineering dept.; the former is chief sales engineer for propellers, the latter is chief sales engineer for aircraft equipment. R. E. McCormick is being transferred to Henderson Standard's E. B. Stroh office at New York. H. H. Hesley, sales manager, charge of eastern sales, Harry M. Arnold, sales service manager, is being transferred to E. B. Stroh's part of that product division.

Howard E. Miller, former H. C. and as associate in the design department, is leaving his post at American Engine & Prop. Corp., N. Y. C., as a vice, and will handle European sales with his firm. Dr. Russell P. Klineberg has been promoted head of aero engineering at Research Products Division, succeeded Dr. Paul E. Boulle who is now director of Research.

E. E. Wurster has been hired Northern Air Corp.'s newly organized special equipment dept., which will conduct research and development projects outside field of management and top research. W. J. Clegg, formerly director of engineering, has been made vice of the organization. W. C. Kaelble has been named chief test engineer.

Lt Col Donald J. Wilkins, USAF, has been appointed to handle U. S. Army and AF recording advertising and publicity. He formerly had worked on AF procurement advertising. Other new appointments: Robert L. Holbrook has been appointed manager of legal dept. of Curtiss-Wright's Propeller division. Wilkins J. Clark has been assigned to a position on AF's Staff's personal staff. Neil Hartwig and Leon Furtach are the newest new director, sales manager and sales manager respectively of Cleveland.

### Honors and Elections

► **Transamerica**, Air Lines-Douglas F. Johnson, president, Bernard A. Nichols, vice chair, and to president, and Samuel A. Wilson, vice-president, have been elected to the board of directors.

Capt. Thomas F. Jenkins, Paragon pilot, has been honored by the office of the president of the American Helicopter Society. E. B. Lewis, up-and-coming director of research and engineering of American Helicopter Laboratories, has received the Fellow award of the Institute of Radio Engineers.

### Recovering

Don Symons, aircraft sales manager for Textron Products, Inc., is reported recovering from a double skull fracture resulting from a fall Jan. 21. He is convalescing at his home, 1030 Delton Rd., Piner Woods Estates, Calif.

## INDUSTRY OBSERVER

► **USAF** test article with a 500-hr. wings has been flying under complete control for nearly two months at White Sands, N. M., with only minor damage to the aircraft. Much is learned, studied, and again tested to determine endurance capabilities of engine and component parts. Instant instrument recovery is important advance in rocket development, both in upper air research and in missile guidance techniques.

► **North American** production engineers are studying a new experimental surface production technique which uses electric application of heat during a cutting process to "soften up" ferrous and non-ferrous metals. Resulted decreased cutting time and longer cutting tool life gives promise of increasing certain applications in sawing, metalizing, drilling, notching and turning operations. Heat application is to each tool through mechanism used in new high-speed control planes plus much to overcome relative thinness and fragility of present-day cutting methods.

► **Todays** turbine engine manufacturers do not necessarily want concrete runways, according to recent CAA aircraft paving tests, let still lighter temperatures in the future may require some changes in paving design and construction. Tests of effect of spatial grid soil on the materials in pavement joints indicate that a transacted heat gain is superior in insulating characteristics as compared to asphalt and the joints. In blast tests with fighter planes, maximum temperature was found at about 10,200 ft. Blast radius at about 16 percent strength. Advancing this to 100 percent heat effect of raising the tail of the plane at the point of contact of blast with pavement was raised out to about 50 ft.

► **Boeing** Airplane Co., Wichita, has started up its first production B-57A to the USAF standard engineering inspection board for a week's inspection prior to preparation for flight. Present indications are at least 75 of the planes are to be built.

► **Canadian Pacific** has delivered Convair jet transports in the new 45-passenger version will include an eight-seat forward smoking compartment and 40 seat main cabin. Manufacturers says the Convair will carry this number of passengers in nonstop stages up to about a maximum of 1750 mi. in around 10 hours. Boeing has the first two Convairs definitely on order [AVIATION WEEK, Dec. 19, 1956]. CPA is negotiating for additional planes.

► **Chase Vought** has incorporated a revised nosewheel on the F7U-1 Cutlass fighter, to get protection of the wheel prior to touchdown. Air from the jet engine compressor is piped to a nozzle which discharges the air square onto the wheel, causing rotation of the aircraft to a peripheral speed of 80 to 100 mph.

► **Boeing** Airplane Co. is taking a look at the Swedish SAAB-90 Scandia, two-seater transport, with a possible view to licensing production of the plane in this country. New aircraft (T-34-1 and 90) will be used in U. S. airshow teams, would carry 20 to 25 passengers and cost \$2150 with \$1000 by for takeoff, designed as replacement engines for the 1400-hp. B-2000s.

► **Some** large manufacturers of components, structures and equipment who have been supplying essential parts of projectiles and aircraft as their own defense products are currently disposed about a growing trend among firms which they have been supplying to get into "competition" by making components previously purchased outside.

► **Protostar** Ansco will soon have a 125-hp. Lycoming engine installed, in place of the 100-hp. Franklin previously used, for further tests preceding to construction of first 34 productive Ansco flying saucers.

► **British Aircraft** Andover's full-span wing has passed a structure test loading at 11.7 times equivalent to the aircraft's 50 ft/lb. weight, or 10.5 fully loaded forward at 100 percent of gross weight, and 10.5 percent of gross weight rearward, carried by the aircraft in study control flight. Test was conducted with a new polygraph electronic recorder, which gives simultaneous readings on all strain gauges as loading is applied, and has been developed by Aircraft's research department. Actually the wing passed the requirement with 20 percent overstrength.



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AVIATION  
WEEK

March 20, 1960

## DME Order: New Life for Airway Plans

\$4 million award takes  
all-weather navigation  
out of planning stage.

By Charles Adams

The airways long-range program for establishing modern electronic navigation and landing aids along the federal airways moves into high gear as multi-million-dollar equipment procurement contracts are let for attention to the intermediate planning phase of the program.

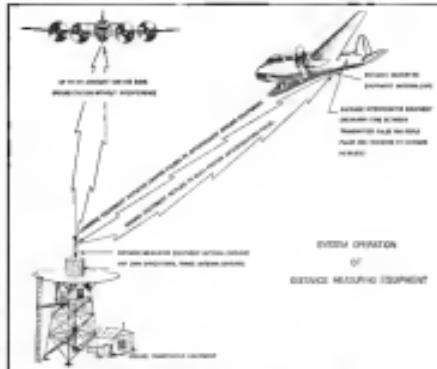
The development was pointed up last week at Civil Aviation Admin. which awarded the largest equipment contract in its history for 450 DME (distance measuring equipment) ground stations costing \$4216,750. Hamilton Electronics Corp., Elgin, Ill., L. J. New York, was let the contract, which also includes work with Federal Telephones & Radio Corp., Cicero, N.Y.; Belden Radio Div. of Belden Radio Corp., Indianapolis, and Specialty Antennas & Piping Co., Inc., Brooklyn, N.Y.

• **Volume Output.** In 1951-DME is a distance-measuring type radio pulse transponder to reflect pulses continuously from their distance from a radio magnet. The DME transponders are part of the air navigation system being installed for both civil and military use under the Radio Technical Commission for Aviation's interim all-weather airway program.

Under terms of the Belden contract, the first DME transponders will be delivered to CAA for testing and evaluation by November, 1962. Five additional transponders will be delivered in March, 1963, with production reaching 40 units monthly by June, 1965. Ground DME equipment should be completely installed and tested for use early in 1962.

DME is a search-improved and search-reduced version of the "TACAN" system developed by the military during World War II. It employed similar pulse techniques. DME uses very high frequencies in the vicinity of 1000 megacycles—higher even than the frequencies employed for the semi-directional radio range, where the DME ground transponders will be located.

Over 300 VHF Distance (VOR) are now operating in the U.S. They



DME ANTENNA is shown on the undercarriage of a DC-3

give pilots exact directional information concerning the flight paths they wish to follow.

• **Close-In DME.** Transponders at Overrange sites will give pilot en route data on how far his plane is from the station. The information will appear on a simple cockpit dial-like radio altimeter reading miles—when given

adjusted readings as the plane progresses along its flight path toward the Overrange site.

At present, except for a few DME-equipped experimental aircraft, distance measurement is available only by calculating from the time of arrival of pulses over a marker beacon or other type of fix, located along an airway or ILS ap-

peak usage. DME measures time in breath in milliseconds of a second, translating the data into miles.

Normal DME range is about 40 miles at 1000 ft. and about 200 miles at very high altitudes. Distances greater than 100 miles have been measured by DME with an accuracy of about two miles deviation in a hundred.

• **Millions for Programs.**—The second CAA currency for 1948 equipment is only a fraction of the money the agency has available for the development of RTCA's technical research program, which includes such aids as precision approach and surveillance radar, enroute landing systems and the census directional radio ranges. CAA's fiscal 1948 budget (440) to be approved by Congress provides a record \$55,175,000 for the RTCA SC 31 program. Appropriations for fiscal 1949 were \$55,753,000 and for fiscal 1949, \$16,163,000.

Included in the 1948 budget are CAA requirements for 25 additional precision approach and 25 census control surveillance radars, 16 DMEs, 2000 range, 10 long-range radars, 100 high-speed radars and 50 VHF/ADF (very high frequency automatic direction finding equipment which permits place identity floating from the control tower and works in conjunction with the surveillance portion of CAA). This is in provision for additional instrument landing systems.

• **Oldies Listed.**—CAA currently has in order 49 surveillance radars, 22 precision approach radars, 44 VHF/ADFs, over 70 11.8 mph and 36 censuses instruments. The mechanical instruments are used to measure the time required for a series of coordinates between traffic control station and control tower. They prevent assignment of more than one aircraft to a single altitude and airspace block.

The radars are operating slowly with CAA as it implements the RTCA program, since about three years at the maximum time lapse between issuance of the facilities and operational utilization of the facilities in the need.

CAA must file its budget agreement with Congress at least one month before the end of a given fiscal year, so far as is possible. It is usually required by Congress, 12-15 months between placing of the order for equipment, delivery of equipment, and six months required for placing the facility in operation.

• **Facilities on Use.**—CAA had these RTCA-programmed areas available as construction as of March 1, 1948: 94 11.8 mph, 325 VHF radio ranges (plus 45 complicated but not commissioned), and 3 precision approach and expert surveillance radars in Chicago, Washington and New York. In addition, three DMEs were operating on test. There are no VHF/ADF installations at the present time.

These high intensity radars, line-type approach and surveillance, just recently completed, are being used by the RTCA's program. The first 11.8 mph and 36 censuses, or soon will be in Washington, D.C., Boston, Newark, and Los Angeles. There are eight Bureau high intensity lightings in Alaska.

• **Appropriations Breakdown.**—Briefly, here's the way money has been appropriated for new airports in the U.S. and its territories through fiscal 1950 (fiscal 1951 breakdown is not yet available).

• **R&B.**—Through fiscal 1948, 96 airports, \$5,300,000; fiscal 1949, 35 airports, \$4,550,000.

• **Alaska Surveillance radar (ASRA).**—Through fiscal 1948, 6 units, \$590,000; fiscal 1949, 27 units, \$7,810,000; fiscal 1950, 34 units, \$1,610,000.

• **Precision approach radar (PAR).**—Through fiscal 1948, 5 units, \$1,655,000; fiscal 1949, no units or funds; fiscal 1950, 14 units, \$4,475,000.

• **DME facilities.**—Through fiscal 1948, 16 units, \$24,600; fiscal 1949, no units or funds; fiscal 1950, 398 units, \$10,231,000.

• **VHF/ADF.**—No units or funds through fiscal 1948; fiscal 1950, 44 units, \$510,000.

• **VHF radio ranges.**—Through fiscal 1948, 415 units, \$10,753,000; no new units or funds.

• **Meteorological radars.**—Through fiscal 1948, no units or funds; fiscal 1949, 8 units, \$17,300; fiscal 1950, 38 units, \$751,800.

The above figures include for expense of installing the facilities and placing them in initial operation, as well as the cost for preparing the aircraft equipment. CAA also has spent about \$418,000 on high-intensity approach light presentation alone.

• **First modern type DME.**—was built by the Canadian Research Group at the National Research Laboratories, Ottawa, Ontario, D. G. Lunn in 1945. The sets of equipment were very similar to that which was used by CAA for test and demonstration purposes. Later, development contracts were given to the industry by both CAA and the Air Force, with the Navy and Airlines purchasing some equipment on these contracts.

• **Cost per Plane.**—Average DME includes a special transmitter and receiver weighing about 50 lbs, although lighter units are under development. One model has around 50 tubes and will cost at the neighborhood of \$5000-6000. Service life of the equipment should be available for 15-18 months.

The Bureau transmitter sends out coded radio pulses which the ground

DME transmitter receives and sends out back to the plane. Time required for this switching is measured by the aircraft receiver, which translates the information to the pilot as time of miles. An average of 30 such requirements between ground and ground DME transmitter occurs each second.

(Used in the cockpit in conjunction

with DME and transceiver equipment is an automatic computer which receives DME and transceiver pulses simultaneously and performs a conversion to the pilot, who may be chosen, even though the compass is not being used (or is being used or does not function).

• **Pilot Frequency.**—To avoid confusion between responses by the DME ground station to various aircraft in the vicinity, a series of "pseudorandom" and "frequency" pulses. Each DME ground transponder can respond up to 50 aircraft simultaneously. When transmission traffic reaches capacity, DME transponder occurs each second.

(Used in the cockpit in conjunction with DME and transceiver equipment is an automatic computer which receives DME and transceiver pulses simultaneously and performs a conversion to the pilot, who may be chosen, even though the compass is not being used (or is being used or does not function).

• **Service.**—Sweeping authority to reorganize the Commerce Department, including the Civil Aviation Administration, will be given to Secretary Charles Sawyer under the President's government reorganization program, submitted to Congress last week.

The program will become effective May 12 (90 days after its submission) unless it is voted by a majority vote of either the House or the Senate. Sawyer previously had stated that "the secretary should be free to determine his own way of organizing the department and making internal assignments."

This is what the Commerce program would do:

- **Secretary Sawyer would be given total control over the department (and total) responsibility for its performance.** This would wipe out partial autonomy now enjoyed by CAA.
- **He would have a free hand to shuffle personnel, functions, as appropriate, property, and research of the department.** This is in line with the Hoover Committee's position that efficient government requires that department heads assume responsibility for their department's operations.
- **He would be given total control over the present top civilian—secretary, under secretary, two assistant secretaries—the latter to be added as additional senior secretary. (For transportation) an administrator assistant secretary, making as vice-presidential officials. This would prevent concentration of authority in the department.**

• **Civil Aviation Board would continue its status as an independent regulatory agency.** This is a victory for CAA Chairman Joseph O'Connell over the Hoover Committee and Sawyer. The Hoover group, with Sawyer's endorsement, proposed that the promulgation of air safety regulations be transferred from CAA to

several-grading activities and the promotion of various activities.

• **Airline Subsidy.**—With the separation of subsidies from annual payments, the time would be ripe for also giving Sawyer general control over airline subsidies. It is estimated that it will take at least another year, however, to work out a system of service payments to air carriers.

Sawyer has long argued that a coordinated and equitable transportation system requires that the most costly basic direct subsidies to carriers and indirect subsidies through continuation of subsidies, as well as other protectionist measures.

• **Sawyer's Voice-Sweeping authority.**—which would be given Sawyer in reorganizing Commerce under the President's program, gives him a new importance. In a letter last year to Chairman John McCallan (D., Ark.) of the Senate Committee on Expediencies in Executive Departments, Sawyer made the following points:

- **Opposed vertical plan of the Hoover Commission to divide the department into two main divisions—a transportation service feeder which would be six bureaus, including a civil aviation bureau, taking over CAA's functions, as well as statistical and congressional work.**
- **Suggested a horizontal system of bureau for the various aviation functions, with chiefs responsible to the secretary.**
- **Opposition should be discontinued with the secretary as civil, air transport should be granted and it developing conditions.**

## Johnson's 'Fat' Is Aviation's 'Muscle'

Secretary of Defense Louis Johnson's fat has been variously referred to as a political football, a political power, a political party, and a political force. It was vigorously opposed by NACA and Sawyer.

• **Integrated Transportation.**—The President's Committee program moves in the direction of integrated control over all transportation. The general Administration attitude indicates that further moves in this direction can be anticipated.

The recommendation recommended in the President's program for aviation activities may favor a parallel set up for aviation activities. Under it the independent air arm, Marine Corps, would be retained. A three-member committee would be located in the Civil Aviation Department to review the need of subsidies and regulatory functions. This would prevent concentration of authority in the department.

• **Civil Aviation Board would continue its status as an independent regulatory agency.** This is a victory for CAA Chairman Joseph O'Connell over the Hoover Committee and Sawyer. The Hoover group, with Sawyer's endorsement, proposed that the promulgation of air safety regulations be transferred from CAA to



CONVAIR XP7Y-1 OUT FOR A CRUISE

Shade profile of Convair's XP7Y-1 long-range, pulse-pumped plane is pointed up in the air. The view taken of the plane during its maiden test flight in San Diego Bay, Calif.

longer than 40 tons, the cost includes a high length-to-width ratio and smaller wings for superior air and water handling characteristics. The four Allison T-40s

triumphing contestants, develop a total of 21,000 shp. Following further water trials for acceptance as air and water handling characteristics. The four Allison T-40s

effective force of only 34 groups by 1953-54, according to USAF, which estimates 70-75 groups. These will be required to stand off an aggressor for an 18-month mobilization period.

- **Closed muscle protection** is cut \$4,200,000.
- **Fleet strength** is cut \$1,464,000, including \$70,000,000 in the operations of aircraft and \$1,075,000 in flight pay both resulting from reductions in pilot and flight crew strength.
- **Industrial mobilization** is limited \$11,100,000, by postponing plans to put the country on war footing on May 1.

In his pre-budget Johnson made no mention of the \$21,460,000 cutback in USAF research and development funds from the \$103,000,000 appropriated by Congress, but did appear to accept the cut in temporary aircraft parts. According to the House Appropriations Committee of Sen. D. I. Ponte, director of research and development, the slowdown in USAF's programs will result in an increased final cost by prolonging the period over which overhead expenses will have to be matched.

Although Johnson stated that "research and development will be maintained (over the coming year) at about the same level as in fiscal year 1950," his 1951 fiscal year budget, now before Congress, cuts his research expenditures for both USAF and the National aerospace and space programs, as follows:

- **USAF**, \$103,072,000, which compares with the \$210,000,000 available under the 1950 fiscal year cost-cutting program.
- **NASA**, \$574,775,600, which compares with the \$77,551,014 available during the current year.

## UAL Will Start Air Coach in May

United Air Lines announced its intention to file for an air coach service between Los Angeles and San Francisco, On March 10.

Under the terms of the date of March 10, 1951, that on which service will be filed with the Civil Aeronautics Board, April 29 is the date on which the company will start selling Los Angeles-San Francisco-Dallas air coach tickets, and May 14 is the due for start of service.

W. A. Peterson, United president, said the airline will use DC-6 planes equipped to carry 70 passengers at a cost of \$10 carried by these planes in United's standard service. These will be the only aircraft used for coach.

United proposes to operate three roundtrips daily at a one-way fare of \$9.95 plus tax, or approximately three cents a mile. Regular Los Angeles-San Francisco fare is \$21.05 plus tax, or an average of \$1.61 cents a mile. Children under two may travel free; those from

two to twelve at half-fare. Flights will operate at regular and intermediate stops in advance according to the company's proposal.

Meanwhile, American Airlines has decided not to resume its coast-to-coast air coach service, suspended during the strike, until April 5, when it will put DC-6s on the run. The service had been carried on with DC-4s.

## Local Air Taxi Service Proposed

Implementation of local air taxi service is approximately 25 localities in which cities with major airports is proposed for this year, with approximately 25 more cities, airports and two or more airports participating. Joseph G. Gandy, president of the Air Taxi Conference of America disclosed last week.

Feasible plans and requirements for the initial taxi run are tentative, subject to the approval of the Air Traffic Conference of America, which will consider them at a meeting April 27 and 28 in Miami.

Gandy and the original program would be a "guaranteed" operation to test out proposed code of operations for the operator, minimum equipment and insurance requirements and code of regulation of the service in a full-scale urban area.

Gandy, president of Wagner Airways, Newbury, Mass., and Bill Naughton, President Aviation, Wethersfield, N. C. and Sam Frazee, Sonnen Am Sonnen, Scarsdale, N. J. are two air taxi group vice presidents, and in Washington last week with Air Traffic Conference representatives for preliminary discussions of the air taxi plan.

First taxi services are expected to be spotted in areas where money is found a good and to give a varied picture of local operating conditions.

Initial planning calls for stations to

sell straight-through air taxi transportation to the passenger's ultimate destination, whether it be in his through airline ticket. Below this can be accomplished however, the station must be satisfied as to the responsibility of the air taxi operator, his insurance coverage, equipment, maintenance, pilot, etc.

Proposed material for an air taxi service includes proposal to place at airline ticket offices and dollars surcharging for taxi service, as part of the eventual passenger program.

Other planning contemplates that the air taxi operation will act as representatives for the stations in offering consumers straight-through tickets beginning with the air taxi transportation to the nearest airline terminal station.

Plans for appointment of an executive responsible for the air taxi function are being deferred pending institution of a large enough group of operators to finance a full-time director, chief office operation.

Meanwhile the three officers are conducting the preliminary organization. Membership applications with an initial fee of \$25 are being accepted from established flight and short-haul flight operators subject to the understanding that they will agree to contribute to the operating practices code being developed as well as from the controllers.

## EAL, TWA Planning To Buy More 4-0-4s

Options on additional Martin 4-0-4s delivered beyond the first firm order by Eastern Air Lines and TWA for 65 planes (AVIATION WEEK, March 13) will run the total program of the two airlines up close to the 100 mark, officials indicated last week.

It was understood that Eastern had options for at least 15 airplanes beyond the original firm order for 35, while the

number optioned by TWA in addition to the firm commitment for 33 planes was believed considerable.

Meanwhile a shift in the sales organization of Martin's most direct competitor for postwar twin-engine transport sales, Convair-Douglas Aircraft Corp., was reported as another outcome of the momentous Martin 4-0-4 sales strike.

Lambert T. Clegg, Convair president and general manager, announced that J. V. Nash had been named director of sales for his company in addition to his previous assignment as director of research. The appointment was cited as a move to strengthen and coordinate the Convair commercial and military sales efforts. D. R. Koenig was promoted to director manager of the company's commercial sales activities, and J. G. Zavod, former mission division supervisor, San Diego, was advanced as manager of contracts, San Diego division, presumably to achieve Nash's end of his contract work.

Another flight of the highly modified twin-engine transport plane pictures the classification by TWA of the aircraft as "Aviation Week, March 6] in least 12 recently completed Martin 2-0-2s were generated transports of 35-passenger capacity.

TWA said these planes due for delivery starting July 1, will be used on medium and short-haul domestic flights, supplementing the TWA fleet of 10 Douglas Constellation aircraft ordered in its prior. It was reported that the Martin 2-0-2s would supplant the older fast-race Boeing Stratocruiser which TWA put back in commercial use in non-passenger 36-passenger version after the USAAZ returned them.

The Stratocruiser are now up for sale.

The 2-0-2s will cruise at 265 mph., are equipped with bubble glass and reversible pitch propellers, and have hydraulically operated seats built into the tail section of the plane. There are also provisions for passengers to carry on their luggage in case time is limited for loading and leaving the plane.

The TWA announcement was taken by the aviation industry as definitive indication that investigation of the recent Northwest Airlines 2-0-2 crash at Minneapolis (AVIATION WEEK, March 13), which killed 10 persons, reports that the plane crashed due to collision with a fence in a cemetery near the airport is extremely poor visibility.

## Seek to Learn Why Plane Struck Pole

Northwest Airlines and Civil Aeronautics Board investigators probing the crash at Minneapolis that cost 10 lives (AVIATION WEEK, Mar. 13), last week

were trying to determine why the plane struck a 67-ft. pole to the left of the normal instrument approach path.

Preliminary opinion is that impact with the pole fractured a section of the left wing of the Martin 2-0-2 and the plane crashed into a house about four miles away after the wing section fell.

The plane, perhaps not realizing extent of the damage from the collision, apparently tried to pull up to go around for another approach.

The 2-0-2 was in a crosswind about 600 ft. south of the instrument runway of Wold-Churchill Field. It was about 400 ft. south of the main runway, and about the same distance to the left of the extended center line of the runway. In a normal instrument approach, landing a plane at that point should have about 200 ft. altitude.

Weather conditions at Wold-Churchill were 400-ft. ceiling and one-half mile visibility. At time of the crash, according to Weather Bureau records, visibility was 900 ft. and visibility one-half mile.

NWA officials are quoted as saying that both immediately before and after the main aerial plane made contact with the instrument approach, the plane was off course, indicating that the Wold-Churchill ILS was functioning properly.

The flag pole was lighted, but not shown on navigation charts as it did not consider it a hazard. NWA says it never complained about the pole. Present plans are to re-erect it, although the new pole may not be as high as the old one.

## AA Settlement Grants Severance Pay

American Airlines and Transport Workers Union (CIO) last week were signing out final details of a new 15-month labor agreement covering the carrier's ground workers. Other airlines are also in the process of signing on their own luggage in case time is limited for loading and leaving the plane.

The eleven-day strike of AA ground workers ended as compromise—but the union was not there. The three airline ground workers have had, however, pay and made headway in its determined fight against airline subcontracting of maintenance work.

• **AA** Next-Next on TWA's list is the only other airline with which it has a contract covering ground workers, Pan American Airways. The airline and the union were scheduled to resume last Thursday negotiations which had been interrupted but by a presidential dispute, and then later when the union became preoccupied with the AA bargaining.

• **TWA** is using Pan Am also to generate "job security" which radiates

assurance and limitations on subcontracting. But the Pan Am problem may be even more delicate than American's. American's losses in job security, at the union's insistence, is in location on moving of maintenance work to other bases (AVIATION WEEK, Mar. 13). Pan Am privately has underway a legal action against maintenance work to

the 1400-ft. high the American replacement has strengthened its position in bargaining with FAA. Other unions of airline ground employees, even though not TWA officials, are expected to benefit from the period-setting AA pact.

Here is how TWA and AA resolved the sticky job security item:

• A letter from Franklin C. B. Smith to Francis J. O'Neill, Jr., chairman of the National Mediation Board, renewing AA's policy on leaving out maintenance and overhead work, and stating that the airline will do its best to maintain job stability among its ground workers.

• Severance pay details of which were still being worked out last week, finally, the company had wanted severance to begin after three years' employment, the union after one year. Fortunately, it looked best work if two years' severance pay would be granted after one year's employment, another two years at the end of the second year, with an additional week for each year thereafter up to a maximum of ten weeks' severance pay after eight years' employment.

• **Pan Am**—Also being talked out was the "fitter" benefit, such as the wage differential between shifts. The contract when signed will not provide for the across-the-board wage increase originally cited by the union. But TWA agreed to keep the wage increase for the South letter to the Mediation Board.

The letter carefully explained that American would not object to making stable employment, but that it would try to do it. And the company did not want to work out that could be done to its advantage, and shifted work in 1949, when it was the best conditions of employment for ground workers or factory became it did contract out maintenance types of work. If the carrier had tried to do such work it would have had to increase its fees for the duration of the job, then cut back.

Although the letter would not be part of the final contract and while it seemed fairly non-committal, TWA relented. The letter was on file at the NMB, the union says. And if American ever contacts out work that TWA thinks it can prove can be done in the carrier's shop, the letter might be a reason to join NMB into referencing the dispute.



FIRST PRODUCTION CUTLASS

Glenn Wright test pilot Fred Thayer makes the first production model PTF-1 Cutlass for its initial flight from Hesley Field, near Dallas, Tex. The initial sweep-



## SALES & SERVICE



SHARP CL-1000 racing from Heliocraft is demonstrated by the biplane version

### Aeronca Will Produce Heliophane

Ohio manufacturer will make the 4-place slow-landing craft, but Heliocraft will handle sales and distribution.

By Alexander McNulty

Short landing and takeoff performance of the new Heliophane Four now in construction at Natick, Mass., will "be like a dream," its 190-hp. ground run for takeoff and landing in record conditions achieved by the unusual two-place prototype Heliophane last year. Aeronca Manufacturing Co. has licensed

Contract arrangements were completed last week with Aeronca Aircraft Corp., Middlebury, Ohio, to manufacture the production four-place version of the Heliophane. The Heliocraft Corp. of Natick, Mass., developer of the plane, which will handle its sales and distribution. (The manufacturing plant was located in Attawand, Wyo., Nov. 25, 1958.)

Transportable, distinctive plane will be the following highlights:

- July 1959—Certification of the Heliophane Four, with parts shipped to Natick for final assembly.
- Production of components of first production planes to start at Aeronca a few weeks after certification, with parts shipped to Natick for final assembly.
- Transfer of final assembly department to Middlebury will take place sometime after completion of the first 25 units at Natick.
- Total 1959 production is scheduled at 100 Heliophane Fours.

Designed and engineered by Prof. Otto Koppens of Massachusetts Institute of Technology in the aerodynamics set up by Prof. Lynn Hollinger of Harvard University school of business adminis-

tration. Yet there are few features of the Heliophane which have not been well proven individually on military and civil craft.

Features of the prototype Heliophane which potentially will be included in standard equipment in the Heliophane Four include:

- Casting landing gear for crosswind landings.
- Full span flaps.
- Leading edge slats automatic, aerodynamically operated.
- Split rudder, half operated by pedals, half linked with stick for two-control flying.
- Long diameter constant speed propeller for high thrust at low propeller rpm.
- Reduction gear arrangement making possible low propeller rpm for ease of rotation, without affecting engine rpm.
- "Black Hawk" engine selector developed by Koppens.

• Straight-in landing as short landing and landing the prototype was able to maintain level flight at speeds below 10 mph. It is expected that the Heliophane Four will be capable of level flight speeds around 30 mph.

The airplane is not expected to lose in cruising performance and range, by the innovation which made the Heliocraft the first of today's general type airplanes which have high initial performance because of their relatively high landing speeds and relatively long landing and takeoff run requirements. This initial study on "Personal Aircraft Business at Airports," published by Harvard, showed the sharp in personal plane sales after the first private boom, as the "unfortunate pattern of limited utility and short sales" the personal aircraft industry had been faced. He is vague about how the Heliophane will fit into the pattern he views as inevitable.

Problems of certification of the first Heliophane Four will be watched with special interest. CAA officials from Administrator Del Hartman on down have pledged full cooperation in getting the Heliophane across the tedious hurdles of certification. Critics of present day CAA procedure see the certification of the Heliophane as a test case. Many think no certification requirements has always been that they were sensible and penalized new ideas while putting a ban on amateur designs and strict conservatism.

Aeronca pointed out that it would continue with production of its 1958 version of the two-place Heliocraft Champion and the four-place Stellar, and paid tribute to the Hollinger-Koppens plane design for its "invariably ahead of utility for business and pleasure."

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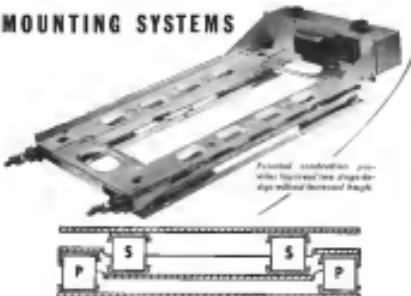


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results obtained from this instrument. ►Ergo-Plan—As a measure of the magnitude of the task, here is a partial list of the conditions under which pressure distribution data is desired—scattered flight (both at dives, rolls, banks, etc.), static, rolling, pitch, abrupt control deflections, jumps, all at both high and low speeds and more.

Than data must then be interpreted into such parameters as span loading due to angle of attack, variation of maximum lift with pitch velocity, variation of control effectiveness and stick force with each of these measures, effect of wing twist on pressure distribution and vice versa, effect of hinge and camber deflection as control effectiveness, critical flutter and divergence speeds, critical Mach number of the surfaces as it affects bending and tension颤动, etc.

►Results to Aerostat—It is apparent that at the date of interest the aeronautic community is new applied control possibility be obtained even during the lifetime of the design.

It is the job of the stress analyst and the aerodynamicist to select only those parameters of vital interest to the safety and performance of the airplane under test and useful for future designs, and to concentrate on obtaining only these data with the greatest economy and speed by the most economical method. This is the difficult problem of the aeronautic scientist and one solved largely on the basis of experience. It is this reason that the Silver Mine 5 program is a joint activity of North American, U. S. Air Force and the Bureau of the NACA.

For the information obtained from this program can have an important bearing on the requirements for future high performance swept wing aircraft and is certain to result in more efficient design methods through utilization of the know-how that is inherent in an tried field.

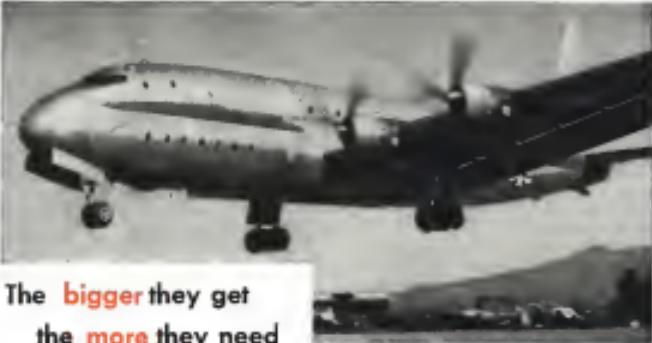
### New Research Plan Would Aid Engineers

Recent House passage of the National Science Foundation Bill means that after five years of delay, the Foundation is likely to become a reality.

The bill will go to conference where differences between it and another passed by the Senate a year ago will be ironed out. Present indications are that the measure will probably be signed by the President, who vetoed a similar bill in 1949.

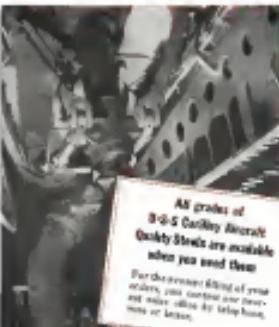
The unique, new federal organization is not planned to build a better airplane or even design a better wind

The Navy's 10-passenger Fairchild Constellation. A specially designed 4-wheel track type landing gear on each side of the plane provides the 90 lbs load over each a wide surface that off CAA Const 4 aircraft will accommodate this great weight.



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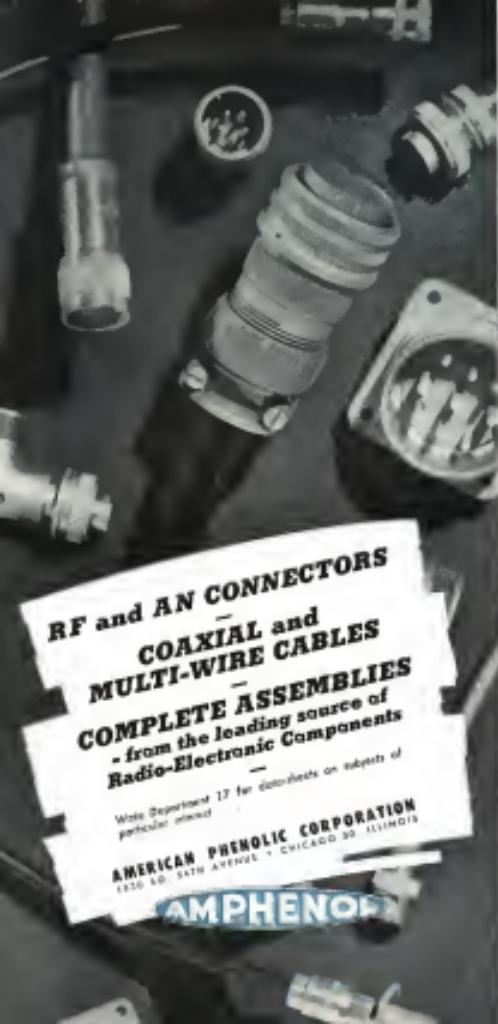
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mental. But it may help to do both these things by promoting basic research in such fields as mathematics and physics as well as in other types of basic investigation.

► **Background:** The foundation was first created in 1946 by Dr. Vannevar Bush, then director of the Office of Scientific Research and Development. In a sense the Foundation grew out of ONSRD, but the approach is to be reversed.

ONSRD expanded and stimulated applied research to make "warhorses" out of the knowledge manpower had accumulated at the laboratory. But this wartime effort "carried over" most of the area of basic research achievement, and didn't replace it. The problem now, as seen by scientists, is to build back up knowledge of fundamental scientific knowledge.

U.S. scientists are about unanimous in supporting the proposed foundation.

► **Operations:** There will be no new laboratories operated by the Foundation.

It will have no control over existing federal research against such as NACA. But, armed with contract funding authority, grants, loans and scholarships, the Foundation will work with existing federal and private laboratories to encourage basic research.

In addition, it will get into war-time research policy by initiating and supporting basic research related to national defense. The plan of the program, the full details, shall be carried out after consultation with the Secretary of Defense.

► **Other Jobs:** Because it cannot likely be funded entirely by the science foundations, the new foundation will permit the new agency to evaluate research programs of both federal and private laboratories. But it will not be able to do more than make recommendations.

Other jobs to be carried out by the Foundation: Further interchange of scientific information, both within the nation and with foreign countries; and maintaining a roster of scientists.

► **Setup:** The President would appoint a full-time, \$50,000-a-year Director and 14 part-time Members of a Policy-Making Board.

Both let it be the first test of the Foundation: if it fails to accept the job, a Dr. Bruce C. Pernick of the Carnegie Institution of Washington.

There is some opposition to scientific studies in two associations put into the job in the House. One would request an FBI investigation of all persons employed by the Foundation and all scholarship recipients; the other would limit funds for the Foundation to \$500,000 for the first year with a ceiling of \$15 million for any year thereafter.



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Bendix Aviation Corporation



Setup for subjecting square disk panel to uniaxial load at horizontal test machine is designed to exert distributed stress evenly around center opening. Colored spring wires are used for uniaxial and uniaxialized loads in simply supported square plates.

## Reinforcement of Openings Studied

Experimental, theoretical checks at NBS bring data on doubler plate fastenings and other hole factors.

The need for openings for maintenance access, windows, doors, lights and removable landing gear is often a limiting factor of aircraft. This has resulted in some perplexing structural considerations.

Frequently, these holes are reinforced with metal rings—double plates, thinning the thickness and radius of the material at the edge of the hole. But it has not been known how well such a reinforcement approach fits the ideal of concentrating the deformation in shear flow to the immediate neighborhood of the hole and, at the same time, adding least weight to the structure.

Studies Initiated.—To get a better understanding of reinforcements and practical requirements in this design, the National Bureau of Standards has been engaged in extensive experimental and theoretical studies sponsored by the National Bureau of Standards.

This work begins with an analysis of experimental reinforcements around a circular hole in a plate under uniaxial tension. To reduce the stress concentration with minimum weight increase, it was found that a reinforcement should concentrate most of its mass near the edge of the hole. Such a modification in the thickness of a reinforcement is not preferred from a construction standpoint.

However, a flat ring, of the same

thickness as the skin and of outside diameter equal to twice the hole diameter, was found to be about as effective. Consequently, this type of reinforcement was selected for further study.

Theory Checked.—The plane stress theory assumed that the reinforcement is an integral part of the sheet and that the stress in the sheet did not exceed the plate thickness. In practice, reinforcement plates are riveted to the sheet skin and large stresses in shear distribute across the thickness very easily.

Tensile tests through the elastic range were applied to a panel with several symmetrical doublets of plates of different sizes and sizes and arrangements to determine the effect of shear stress variations on the accuracy of the plane stress analysis.

Strain measurements were taken at several positions in both the sheet and the reinforcement. Comparison of the measured strains with those computed from the plane stress theory showed good agreement outside the reinforced area.

Measured and computed relationships agreed well in the case of a reinforcing ring fastened with two concentric rows of rivets.

Rivets, Adhesive—Outer surfaces of modern aircraft must be kept smooth as possible to minimize drag so that the airplane can attain higher speeds.

Hence, hole reinforcements are placed on the outer surface only.

A panel with an annular reinforcement was chosen for test to better reveal that the principal effect of reinforcing one side of a sheet is to introduce bending moments which tend to bring the reinforcement into the plane of the sheet. High bending stresses may then occur in the reinforce- ment itself.

Since the ratio of panels with riveted doublets indicated that there was an incomplete transfer of load from the sheet to the doublets, a tensile test was made of a panel with a single rivet in the center of the hole and bonded to the sheet with an adhesive. Agreement between experimental results and those computed from the plane stress theory was excellent.

Curved Surface—Rivets holes may be twisted in the curved surface of an aircraft and it is desirable to know the effect of this curvature on the stress distributions around the hole. Comparative tests were made on curved panels whose ratio of curvature varied from 10 to 40 in. to infinity (flat sheet).

The test data were analyzed in terms of the plane stress theory, neglecting curvature, since on these, the curved sheet with a uniform circular hole was available. Computed values for stress concentrations throughout the sheet agree very well with those determined experimentally for the normalized ratios of the panels.

In the normalized regions, however, the stress in the sheet near the hole was greater than the computed stress while those in the reinforcement were lower.

This may be traced to the fact that the reinforcements in these tests were fastened with only one row of rivets and thus did not function as an integral part of the sheet. Reinforcement measurements show that reinforcement of the hole does reduce bending in the immediate vicinity of the hole. A reinforcement on one side of the sheet only has a large amount of load on the skin thickness of the sheet and thus reduces bending better than a symmetrical reinforcement of the sheet thickness.

► Backing Plates—Importance of these plates, which are used to eliminate shear at the edge of the hole, which occurs when the critical load of a panel is exceeded.

The effect of cut-outs on the bending load has been studied both with and without reinforcement. The maximum bending load was determined theoretically for six single-supported square plates, three of which had reinforced corner holes of different dimensions. Backing loads for these plates were found to be only slightly



# A Progress Report on the Collins STEERING COMPUTER...

FOR SEVERAL YEARS the Engineering and Research Departments of Collins Radio Company have been working on a number of ideas for improving aircraft instrumentation and methods of flight control. One important result of this work is the development of aircraft equipment and instruments which present to the pilot easily interpreted steering information for flying ILS approaches.

In brief, this new equipment obtains heading, rate of turn, altitude and other flight information from the aircraft instruments and adds and computes, instant by instant, steering information for the pilot. This information displayed on one easily visible compass-type of instrument, tells the pilot how to maneuver his airplane to make good a chosen course. He is thus relieved of the present necessity for continually scanning and interpreting a large number of flight instruments to obtain this same information.

The steering information provided by the equipment assists the pilot to fly a precise course on the ILS beam, thus preventing landings without excessive maneuvering after breakout. All factors influencing flight are taken into account and the steering information is automatically corrected against potential errors, particularly those due to presence of wind, change of wind direction or velocity, change in aircraft trim, speed, power setting or flap posi-

tion, and irregularities or short period disturbances in the ILS beam. Steering information is also provided during executive flying for maneuvering port-and-starboard, altitude and pitch attitude and for making precision turns and pitch attitude.

Executive flight and laboratory tests have proven the worthiness of this idea and the capability of the equipment. Engineering of the equipment to specific types of aircraft and to meet all demands of various operating requirements remains to be accomplished. Collins is most interested in assuring that the final design, form and function of the equipment is determined in cooperation with the airlines and other aircraft operators. To this end Collins is hopeful that interested operators will wish to share in extensive flight evaluation tests of pre-production models of this equipment under their own routine

**THE STEERING COMPUTER** is the flight data from the aircraft gyro steering test-a-mission landing selector, gyro horizon and DLS ratio conversion system. Radio air pressure and the aircraft's altitude and day and floor mounted gyro air pressure are also required. Electrical and air pressure connections of the computer are installed at a pre-manned aircraft; only one required to the computer.

**THE PILOT'S STEERING INDICATOR** presents easily interpreted steering information in the form of deflection of two cross pointers. The left pointer indicates the aircraft's heading and the right pointer its roll as long as trim pointers remain. The instrument also contains information displays and computer function engage. Various steering information such as constant altitude, pitch attitude or ground speed is selected on the upper left switch. The right lower switch selects horizontal steering information, or heading, compass or DLS heading.

operating conditions. Models of the equipment, including full instrumentation, will be available in the months to come, at reasonable cost, for flight evaluations. Various forms of steering display instruments will be available. For example, the Pilot's Steering Indicator illustrates combined steering display and computer function control. Another type of PSC will combine steering display and artificial horizon.

The Steering Computer and instrumentation is the first equipment resulting from the Collins Radio Company's flight instrumentation development program, the goal of which is a completely coordinated system of navigation and flight control.

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(Continued from page 28)

in this way, the plane stress theory can be used in the elastic region for computations of the average modulus, surface stresses in the sheet and surface stresses to predict changes in the hole diameter.

Measurement of one side of the sheet only is possible because the system, which is used to bring the measurement into the plane of the sheet and to convert it to bending stresses in the random sheet of the same order of magnitude as the medium fiber stresses.

The medium fiber stresses in the area inferior region of cylindrically curved panels of moderate curvature can be determined with sufficient accuracy from the plane stress theory for flat panels.

An actuator in a square panel, portably in the panel in under bending load, may reduce the bending stress considerably. Reinforcement of the hole may increase the composite and shear bending stresses to values higher than those for a panel without a hole.

The present system may be used to compute accurately the stress distributions in the neighborhood of a riveted, flanged, clecoed hole loaded by a pin. In a plate of sandwich construction, where practically all the load is carried by sheets of metal bonded to each other or to a light-weight core.

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This new equipment, the first of over seven years research conducted by the university under Navy sponsorship, is said to be decidedly more versatile than light beam communication systems developed by the Germans and Japanese during World War II.

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The medium fiber stresses in the area inferior region of cylindrically curved panels of moderate curvature can be determined with sufficient accuracy from the plane stress theory for flat panels.

An actuator in a square panel, portably in the panel in under bending load, may reduce the bending stress considerably. Reinforcement of the hole may increase the composite and shear bending stresses to values higher than those for a panel without a hole.

The present system may be used to compute accurately the stress distributions in the neighborhood of a riveted, flanged, clecoed hole loaded by a pin. In a plate of sandwich construction, where practically all the load is carried by sheets of metal bonded to each other or to a light-weight core.

An actuator in a square panel, portably in the panel in under bending load, may reduce the bending stress considerably. Reinforcement of the hole may increase the composite and shear bending stresses to values higher than those for a panel without a hole.

A portable unit, which will replace the white-tie hole, has been developed for field use. It can be carried easily by one man and with its wide beam angle can be effectively used to contact men or tools.

► **Light Source.** The new system employs a gas discharge light source which can be varied electrically to attain voice communication. One light source employed in the transmitter unit is a carbon vapor arcing lamp operating in an atmosphere of argon gas.

The transmitter light from the lamp is shielded so that emitted by yellow sodium vapor lamp and the street light, except that the sodium vapor arcing lamp is in the area below red region just beyond the visible range.

► **How It Functions.** Operation of the equipment is described briefly by Professor Walter S. Headley, research associate in Mathematics' department of NBS.

The light intensity from the transmitter is varied in accordance with the frequency of the voice. The light beam falls on a light sensitive mirror at a distance, the signals are amplified and the fluctuations are then converted back into voice signals, which can be received on head sets or over a public address system.

#### QUESTION:

What do the experienced "old hands" of aircraft maintenance parts to keep this instrument well done at minimum attention?

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## Voice Communication By Light Beam

Development of equipment which makes possible aircraft and auto-ground voice communications over an invisible light beam, has been disclosed by physicists at Northwestern University laboratories.



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# Whittaker





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Some details . . . the Compactor is a completely self-contained, self-actuating and self-controlling actuated mechanism. It holds extrusions of plastic (heat resistant) operate directly from screw jacks and eliminate the cumbersome series of pins and wires (leakages found in other actuators). Service is simple, too, may be done without the use of special tools or equipment.

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## Pilot-Scientists

Advanced course trains specialists for probing secrets of fast flight.

First details of a graduate school at Princeton, designed to train young picked groups of Air Force and Navy engineers to become "aeronautic scientists," were revealed at an initial news forum on supersonic flight conducted recently under the sponsorship of the Aviation Writers Association in cooperation with the academy.

The school has been set up to give test pilots a broad base in advanced aeronautical engineering. Through advanced flight and classroom demonstration, it is training them to observe and explain the unusual phenomena encountered in transonic and supersonic flight.

Major aim of course is to turn out pilot-scientists capable of generating their own ideas in the solution of aeronautical problems and to instill in these young the urge to take more initiative in airframe research.

It is believed that training will afford more effective use of research craft as tools for probing into many of the unknowns of transonic and supersonic flight. And it should result in more intelligent gathering, by pilots, of quantitative research data critical to the development of future high-speed fighter aircraft.

► **Research**—Fundamental—Blended by Professor Crawford D. Peixoto, formerly associated with the aerodynamics laboratory at Wright Field, the training program called "Flight Engineering Research" expects that new students should be pilots and have at least an engineering degree.

Some students come direct from West Point, while others are selected research pilots. So far, 25 men have gone through the two-year course. Presently, there are 10 AFM, 10 Navy and 2 Marine pilots, and 1 ground officer attending, while the Navy plans to double the number of its students next year.

Not all studying is done in that course. Many problems are worked out in aircraft flight—with a Convair 140 and a B-57 bomber.

► **Shortage**—The need for the school was seen shortly after the war, when it became apparent with the increased use of research craft that there was a severe shortage of military pilots technically qualified for scientific investigation of flight phenomena in the transonic-supersonic area.

According to Peixoto, there were some "second pilots" in these groups,

but most simply were very good pilots with engineering backgrounds two years for the extremely complex job at hand.

Even now, Peixoto claims, Wright Field "is not carrying the ball in flight research." It needs "some pilots with ideas" who approach the difficult air research task primarily as an amateur.

He believes proper training will overcome this shortage of ideas and men and says "we can effectively handle the new field of applied aerodynamics." Currently, says Peixoto, NACA pilot scientists, on the whole, the best flight research group is the Navy.

► **Research**—Aircraft—One reason for the shortage of aircraft pilots, states Peixoto, is the greater emphasis on the use of research planes, rather than, wind tunnels, to gather data for the design of supersonic craft.

He says that the ability of wind tunnels to prove the way in aircraft design, apparently predict performance of high-speed craft while they're still on the drawing board, and reveal costly design errors before they are built into a plane, has dropped sharply with the advent of transonic-supersonic flight.

For this reason, he claims, a major part of advanced aerodynamics research—particularly in the area of transonic flight—is left "abandoned" on the ground. Peixoto says, "We now are moving into an area where aircraft test flights and the use of research craft becomes the primary way of research effort, because there is no way to get the same information from wind tunnels."

► **Transonic**—Fundamental—Blended by Peixoto, Peixoto believes that for the next five years at least, the major source of research material for aircraft designers will be the results of the flight program being conducted by the AFM, Navy and NASA.

He points out that first instance of practical transonic-supersonic research are now the developing high-speed models at some of aerospace tunnels. Peixoto, the Research Director at Langley, claims to have low to extremely accurate airflow conditions maintained in aircraft flight, he says.

Peixoto claims that at transonic speeds "wind tunnels are about useless in a matter of obtaining experimental evidence" and, that with present knowledge, "there is not much point in building tunnels for gathering transonic data."

► **High Flight**—Cirrus-Heij—While numbers using large-scale models "can predict very accurately how a plane will do" for subsonic flight, "will do when it is built," it is almost impossible "to translate findings with present interest" in aircraft speed ranging from Mach .95 to 1.25." However, the two year course up to present is about Mach .5 to .75" (Continued on page 186)

## Outstanding by any Standards.

# NEW ADEL 3000 PSI RELIEF VALVES

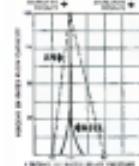
### SURFACE CAPACITY

AFM 1000 psi relief valves provide maximum flow capacity for a given line size. Their maximum capacity is 180 to more than 400 per min greater than those required by AFM standards.

### FLOW CAPACITY DATA (gpm)

LINE SIZE	1000 psi		
	1/2"	3/4"	1"
AFM Standard	12	3.0	1.0
AFM 1000 psi	3	.75	.25

### COMPARE PERFORMANCE



AFM 1000 psi relief valves are designed to maintain zero initial leakage to a pressure 50 per cent above the set pressure. 100 psi less than dynamic cracking pressure, and 100 psi less than dynamic pressure drop. These valves are certified by AFM to AFM-A-2000 standards. From cracking point to maximum rated capacity is less than that required by AFM standards.

### COMPARE WEIGHT

AFM 1000 psi, Class CD, relief valves weigh nearly as much as AFM 2175 valves. The extremely compact, light weight construction of AFM 1000 psi valves is 40 to 45 per cent less weight than conventional valves.

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base and into lock  
base. Rivet base is  
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and lock-washer base  
is secured by rivet  
base and lock-washer  
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## ENGINEERING FORUM

### Spray Plane

Con . . .

Pekulis believes that findings in aircraft flight experiments will aid in the development of improved aircraft. In line with this, the AF is planning to build high-speed tunnels with much larger test sections than available in present installations.

When asked by AVIATION WEEK if it would be more economical to use development and use wind tunnels, instead of ground tests, as the primary source of gathering data for the design of future aerospace craft, Pekulis declared that "wind tunnel development may be as costly as development of research planes. There are two schools of thought on that subject."

Meanwhile, says Pekulis, pilot-scientists are taking over where wind tunnel leave off, to presently investigate unknown phases of high-speed flight

### Agency Urged For Jet Fuel Research

Continued at a research institute to coordinate efforts to improve rocket and jet engine fuels in proposed by Dr. Paul Zweizig, Cal Tech professor and director of research at Aerjet Engineering Corp., Azusa, Calif.

When it was learned by the U.S. that it was in demand the data on rates of chemical reactions which are vital to weapons engaged in development of new jet engines, Zweizig declared as an article in Chemical and Engineering News: "Neither is there any agency which possesses the necessary personnel and the scientific apparatus to accumulate such data with sufficient speed."

He points out that one of the major problems in jet fuel development is how to achieve the transition from inertness to fuel reactivity in propellants. "While fast reactions must take place in the combustion chamber, they must not occur in general. There, the propellants must interpenetrate but must not damage and/or the fuel system of the jet engine."

Noting that most jet propellants generate smoke exhaust, Zweizig says it is possible to make any propellant combustion more efficient, even if the combustion products, solid exhaust products. Solution of this problem, he adds, would greatly widen the choice of suitable propellants for jet motion of all types.

"Knowledge of the kinetics of chemical reactions is not only important in the field of jet propulsion but is important of other fields," Zweizig said. "Basic knowledge gained on reaction rates is likely to shed light on problems arising in equally different fields, and support for an organization to gather such data might be forthcoming from different sources."

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THIS SPARK PLUG is one of the set of thirty-six (36) which operated in the #4 engine #75757 in Eastern Air Lines' new type Lockheed Constellation #115A for 111 consecutive hours of trouble-free operation. This amount of operating time, which is most unusual, based on an average cruising speed of 360 MPH, is equal to approximately 245,000 miles, or about ten times the distance around the world at the Equator, and during this period the spark plug fired approximately sixty million times. This type of service from a spark plug is remarkable even when compared to the type of opera-

Actual photo of one of the  
36 spark plugs in the  
#4 engine of Eastern  
Air Lines Lockheed Constellation  
as a champion.



tion as recent as a year ago. Also, to its credit can be added that during its life it was one of the spark plugs (none of which were changed) that helped carry myself and party on our Latin American Tour during August of 1940.<sup>14</sup>

*Eddie Rickenbacker*

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# ENGINEERS NOTEBOOK



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IDEAL JOINT IN AIRCRAFT INSTRU  
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SIZES LINERS AVAILABLE FOR TWO  
COUPLINGS TO COVER A WIDE SPAN  
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SUSPENSION AGAINST PARABOLIC PATH  
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area. According with Hugh De Hovia, Director of Crisis Safety Research at Cor set Metals Corp., design is to designed to withstand the maximum possible overpressure as a damage operator and pilot, whereas for full altitude zone experience pertinent to the cost of operating and maintaining in atmospheric conditions, the type of aircraft followed by Mr. De Hovia—two-seat aircraft, two-seat high-altitude aircraft, two-seat pressurized, and finally, having a static pressure demonstration of the little crash protection afforded by present day aircraft plans.

Replies shortly to Mr. Bannister's request for objection, the writer wonders whether the 100 aircraft, the 500 originally planned, 97 clearly of experienced design pilots and the seven injured of 72 others? Or is the total destruction of half a million dollars worth of aircraft engaged in operational activities?

Another point will have checked out as ascertained earlier before he stated only a "Marin jet" concerning the rather title of "Marin joint" in aircraft industry. Many joints points are being used, including between aircraft and engines, aircraft to radars, and various controls, as such rate markedly could result from the head striking the instrument panel, or the spine breaking when the pilot's head and the seat hit bottom. Very few injuries claim human factors.

For example, the part of the aircraft is concerned with cockpit which is designed in whole or in part as a cockpit in itself, would not only help to save lives but would also directly benefit Mr. Bannister as in other operating thereby decreased maintenance, increased reliability and insurance rates. The writer fails to understand his reference to the "hundred other things that don't make sense."

And the writer is sure that the "development section" and others concerned with aircraft safety and reliability, including the White of Texas, A.O. M. and the G.A.A. would appreciate any concrete proposals as suggested that Mr. Bannister might take the time and risk to offer.

A. HOWARD HARRISON,  
Aero-Hydraulics,  
Kingston, Long Island,  
New York

## Cites Early Copter

Against the article "Counterpoint: Is the Cessna First" (Aviation Week, Dec. 26, 1968), here's an idea you may not have seen:

The first patented model of such type (helicopter) in this country was that of Mr. Charles Nelson in 1951. It consisted of a main engine and propeller adjustable for vertical and horizontal flight. The "debut" was on January 17, 1952, at the First Conference of Flight in America," by Jonathan Millikoff, Jr., Princeton University Press, 1964.

This type of flying always brings to mind Donavan's crack about all her best ideas being stolen by the Japanese.

Edward M. Hirschman  
Box 9775, Los Angeles Station,  
Los Angeles 12, Calif.

# FINANCIAL

## Industry Benefits From 4-0-4 Sales

TWA, EAL purchase of Martin plane could bring industry-wide revival of interest in transport market.

The several of orders for a variety of the Martin twin-engine transport may well prompt the aircraft industry to make further reevaluation of the large development costs that have gone into its own original projects.

► **Desired Down, Cost Up**—At the air show to an end, no less than five aircraft manufacturers made all you old hands to wonder separate entries for the commercial field. In retrospect, it is now clear that the anticipated development for new transports was greatly overestimated. Another important consideration, which became evident in time went on, was far greater costs necessary to complete the actual development and initial production of these new-type transports.

Original engineering and development budgets contemplated a total cost of from \$1 to \$3 million to put a successful prototype into production. Subsequent experience revealed that such costs run upwards to \$10 million.

► **Martin Sales**—The Glass L. Martin Company was among the first to come forward with a possible transport designed to incorporate some reevaluation. In fact, in 1962, the G.L.M. was the result of a desire to meet requirements submitted by Air Transport Area.

Since its inception, the aircraft project has taken an estimated \$40 million from the Martin Company. Only 10 3-D-2s were sold.

► **Good Idea Went Wrong**—It is now

recognized that use of the factors responsible for the large Martin development cost was the company decision to place its model in an actual line production without benefit of a prototype. It was long felt that considerable savings would be eliminated by this method.

As overall costs increased, however, the engineering firm that developed the aircraft manufacturing had to be converted as the assembly line at a far greater total cost.

For the most part, the Martin company took its loss on the twin-engine transport project during 1967 and 1968. Accordingly, it would appear that, from an accounting standpoint, any production costs reduced from the buildup of the \$5.4-0-4 for Eastern and TWA were not be faced with any amortization charges for past development costs.

In other words, having absorbed its

heavy development charges in past years, Martin may now be expected to be relieved of such expenses in subsequent delivery of that type aircraft.

► **More to Come**—It is likely that additional orders for the 4-0-4 may come to Martin. In the first place, both East and TWA have options to purchase additional planes in this category. Also, with the refinement of this transport by these two major carriers, a need for additional aircraft based upon the problem of regional, extended DC-9s or similar aircraft, and regional equipment, may be expected to be present.

Delivery of the 4-0-4, however, may not begin before the Martin sales figures start 1972 and 1973.

► **Comair Story—Consolidated**

Velvet Aircraft Corp. has yet to cover the bulk of its development costs on its commercial transport version, the Comair-Liner. It is estimated that more than \$10 million has been lost and charged off in recent years on that project.

In this instance, the company incurred large initial losses as a cost factor of incorporating its product into an area that was naturally slow to develop. In this case, however, it is felt that the size project helped eliminate the losses.

For example, with Avco's Comair-Liner at about \$25,000 each, it was

difficult to provide other outlets to buy the product at more than \$100,000.

All told, about 115 Comair-Liners

were sold to U.S. carriers with more planes placed in foreign airline service. Obviously, the TWA and EAL order completes these figures from the Comair-Liner. The flavor of extensive development costs for this one-engine commercial transport model to be absorbed by Comair's action in buying Avco's 4-0-4, its wholly-owned subsidiary, thus as an independent entity.

► **No Lessor**—Aerojet, Inc., was formed more than a year ago as a finance company to purchase Comair Liners from Consolidated-Vultee and less them to others with the option ultimately to purchase the planes.

Aerojet hoped to raise a substantial part of the needed capital requirements through loans from the Reconstruction Finance Corp. Negotiations at one

time were reported as "fairly well advanced for the loan of planes to certain airlines." The management crew declared that it "hopes to dispose of less than 100 Comair Liners through the first half of the financial year."

It would be logical to assume, however, to assume that Comair may be written off as a factor in the commercial transport market. The company's failure in placing orders with General Motors in the development of a turbo-prop transport may yet prove the paradigm to swing the bat.

► **Boeing Story—Further convincing evidence of the expense of introducing a commercial transport is borne out by the experience of Boeing Airplane Co. with its Stratocruiser program. The company fully expected to realize a profit on that project when it was first launched in 1945.**

The case being, much of the basic engineering was done by the long experience available on the military version. Further, the company was involved in its commercial program with prototype aircraft. Unlike other aircraft builders, Boeing exacted substantial deposit and progress payments on its transport orders. And the usual protective provisions such as conflict clauses were incorporated in its sales agreements.

Five years for 55 planes were secured from four American carriers and two foreign airlines. Deliveries were first expected to start in 1947. Various modifications and improvements were finally delayed that period. A major event in the company's Seattle history followed production decline in 1950.

There were originally planned a total of \$15,400,000 up to Sept. 30, 1949. It is possible further losses will be entailed and attributed to the fall 1949 quarter and perhaps for 1950 periods as well.

► **Douglas and Lockheed**—The main difference in their commercial transport development programs have been Douglas and Lockheed. Both companies went through the same initial early engineering and development programs. However, sufficient orders were subsequently received by Lockheed by Douglas for their Constellation and DC-6 programs, respectively, to make both projects profitable ones.

It is fair to note that much of the development costs incurred in the transoceanic transport market in the various commercial transport projects were cushioned by tax credits built up by the profitable operations of the war years. In the absence of such a "cushion" now which will make aircraft manufacturers benefits before they embark upon the development of new non-commercial transports in the absence of a guaranteed market.

—Solly Altschall









Blockade are still at odds. National is well aware that it can't afford another pilot strike. The fallout at TWA was largely responsible for the carrier's eye-popping net loss of \$1,670,000 that year.

Last year, with the help of higher fuel and wage increases, traffic development (handled by New York's mainline and feeder services), National cut its loss to \$20,731. Passenger revenues rebounded from \$6,195,000 in 1968 to \$11,349,800 in 1969.

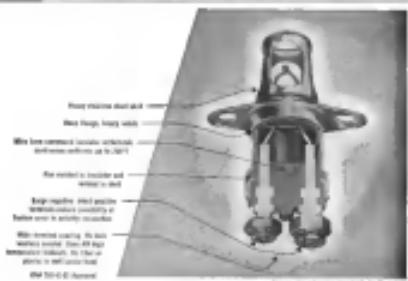
Capitalizing on Florida's winter traffic, NAT, well and during the first two months of 1970, in January, the carrier flew 21,500,000 revenue passengers

—up 16.9 percent with 16,198,000 in the same month last year. In February, National flew a record 26,424,000 passenger miles, up 47 percent over 1969.

## O'Connell Would Tax Aviation Gasoline

• A 1-cent-a-gallon federal tax on high-octane aviation gasoline, starting in 1973, has been recommended by Civil Aviation Administration. The tax would go toward putting the federal money on a self-supporting basis.

In testimony before the House Interstate and Foreign Commerce Committee



**HOW...** another plus for EDISON FIRE DETECTION  
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The new Edison 35516 Thermocouple Detector is interchangeable with the previous model. It further improves the performance and reduces maintenance requirements of Edison Aircraft Fire Detection in aircraft power plant service. Staff Natl Publication No. 3803-A

**INSTRUMENT DIVISION**  
**THOMAS A. EDISON,**  
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tax, CAA Administrator D. W. Riedel estimated that the tax would yield \$100,000,000 annually. Members of the House Appropriations Committee however consider the CAA proposal sufficient and are pushing for a similar plan for meeting money needs.

Other testimony at the opening session of the Commerce Committee's hearings on the overall transportation budget was:

• Joseph O'Connell, chairman of the Civil Aviation Board, who called for a "reexamination of existing air route patterns and route stops so as to create a more efficient and efficient air transportation system." He suggested that the CAB should be disbanded as an independent body, with a long-range downward trend in fare. But he qualified that the Board disapproves fare cuts supported by government subsidies. He also opposed integration of CAB into an overall transportation agency, claiming that an integrated committee is required special treatment.

• Adm. DeWitt C. Ramsey, president of Aircraft Industries Asia, who urged prompt initiation of a government-financed program for development of conventional cargo and transport prototypes. Pending in England's legislature is a bill that will not be enacted that will allow the U. S. two to four years to build a supersonic high-speed prototype and another two years of testing before production.

Highlights of Ramsey's testimony:

• **Prototype development.** He supported a program, proposed by ACC and now before the House of the Budget, under which the government would finance testing costs on commercial transport and cargo prototypes to stimulate private development. He predicted that jet power will gradually appear in air transportation in this manner.

Jet engines will be installed in existing transports, wet jet brackets will be converted to commercial use, and finally, completely new planes will be designed around jet power plants.

• **Scheduled air transportation's future is bright.** While non-scheduled operators have a rough road ahead, he thought. Riedel estimated a 10 percent increase in passenger traffic and a 15 percent increase in cargo traffic for the scheduled carriers this year, over last year. Pointing out that last year airship operators carried only one percent as many passengers and only one percent as many cargo as the scheduled lines, Riedel predicted increasing diversion of business from cargo to regular carriers.

• The Stagecoach Del. holds little immediate future promise primarily because a plane has not been developed with a collection value worth its cost and operational expense.



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The many productive applications of Edison Remote Solenoids may seem like a dependency, but the carrying of standard loads related to the use of rugged, hydraulic valves in heavy-duty industrial handling equipment.

Five Edison Remote Solenoid models are manufactured. Dimensions range from 1/2 to 2 1/2 inches. Production output up to 90° can be engineered to suit your products requirements. Standard ratings require a 41° stroke range from 1/2 pound-inch to 30 pound-inch.

We supply in quantity sizes and assist the opportunity to be of assistance in engineering a Edison Remote Solenoid to meet your product's requirements.

Model No.	1	2	3	4	5	6
stroke	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
stroke	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
stroke	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"

Hydraulic actuator size and stroke distance along with the required stroke speed and load will determine the size of the motor and the number of solenoids required to meet your needs.

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## NWA Plans More Air Coach Seat Capacity

Northwest Airlines plans to convert an pair of its DC-4s to 66-passenger air coach service, suggesting its growing air coach fleet.

Conversion of the two ships which will go into service on the New York-Seattle run is to begin handled by General Contract Airport Co., Cleveland. Cabin Work on the first plane is to be completed by Apr. 15, the second Apr. 21.

International Air of Macau has approved a strike against NWA because of the work "forsaken" to independent maintenance companies. (AVIATION Week, Feb. 20)

**Five fabric features by Bridgeport**



Bridgeport Upholstery Fabrics are 100% wool, woven smooth or chenille with clinging textures.



Bridgeport Upholstery Fabrics are corded fashioned by C.A. — they do not support combustion.



Bridgeport Upholstery Fabrics are tightly woven to resist dirt and stains. They can be brushed bright or mottled.



Bridgeport Upholstery Fabrics are an innovation that they can be matted up to 30% quicker.



Bridgeport Upholstery Fabrics are available in many colors and weaves to suit your interior needs. Wear for complete wearers and complete cleaners.

**Identify Bridgeport fabrics for red insulation.**

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ended Mar. 7 and expects substantial traffic gains in 1959.

► **Compania Dominicana de Aviacion** has sold CAB for a foreign air carrier permit to fly from Ciudad Trujillo, Dominican Republic, its home base, to San Juan, Puerto Rico, and Miami. Pan American Airways holds 340 of the carrier's 1,000 shares of outstanding stock.

► **National** is seeking a CAB certificate to operate scheduled and/or non-scheduled flights from Miami and West Palm Beach, Fla., to West End and Nassau, Bahamas, British West Indies. ► **National-Blu** signed CAB for an aerotow to serve the Chinese Nationalist city of Taipei, Formosa, on its Tokyo-Makati line. NWIA was forced to suspend service at Shanghai in May, 1949, because of the Chinese civil war. Carrier has a record operating budget of \$1,200,000 this year.

► **Robert Atkins** is seeking CAB permission to operate from Miami and West Palm Beach, Fla., to West End, Grand Bahama Island.

► **Tour-American Airways**—The trans-

continental nonstop airline flew 6,932 revenue passengers 14,024,910 revenue passenger miles in 1948 and showed an operating profit of \$30,833 on gross revenues of \$163,658. Based at Burlingame, Calif., the company is headed by Roland Wiss-Tobin and uses C-46 and DC-3 equipment.

► **Trans-Pacific**—The Honolulu-based carrier has applied CAB for a certificate amendment permitting the carriage of mail. TPA was certificated in January, 1949, to carry passengers and cargo only in competition with Hawaiian Airlines. But it has lost money since starting regular service but has had success for a \$175,000 Reconstruction Finance Corp. loan. TPA has 5 TDC-3s.

► **EW-Air** is to stop service at Springfield, Ohio, and Richmond, Ind., because of insufficient traffic when its temporary permit expires next September. It will also drop Lima and Paducah, which were certificated temporarily to TWA in 1947 but have since closed as service because of inadequate airports. The company wants CAB to grant emergency service extensions at Mansfield and Marion, O., and a three-month extension at Zanesville, O.

► **United**—February traffic dropped by 70 percent from 1949 through 1951, says a spokesman. Passenger load rose 1.5 percent, mail load 10.4 percent, express 10.7 percent, and freight tonnage 1.3 percent. U.S. 600 passenger load average nearly 18 months' service. A year ago load was less than in about 15 months with restricted operations.

## CAB SCHEDULE

For 60 years, 1000-GRAN has built a reputation for manufacturing parts to exacting tolerances and standards to the lowest possible cost. Send your requirements to: 1000-GRAN, Inc., 1000 Glass Street, Co., Brooklyn, N.Y.

## CONTRACT MACHINING



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## POSITIONS WANTED

1000-GRAN has a job opening for a machinist. Experience in aircraft parts required. Send resume to: 1000-GRAN, Inc., 1000 Glass Street, Co., Brooklyn, N.Y.

► **SAFETY**—Flight Safety Foundation, Inc., 1000 16th Street, N.W., Washington, D.C. 20006, is seeking a safety engineer. Experience in aircraft safety required. Send resume to: 1000 16th Street, N.W., Washington, D.C. 20006.

► **PIASECKI**—PIASECKI Helicopter Corp., Morton, Pa., Philadelphia Suburb, is seeking a mechanical engineer. Experience in aircraft design required. Send resume to: 1000 16th Street, N.W., Washington, D.C. 20006.

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# STRICTLY PERSONAL

WASHINGTON, D. C.

Joe Crofting, manager of ALCA's Personal Assessments Council, is back at the office several days a week after an enforced hibernation due to illness...

His former co-workers on *Americana* Wines' staff got a telephone bulletin from Ross Hock, new public relations manager for Pratt & Whitney at East Hartford. Hock is a third son, Robert, the late. That "Lew" bequeathed the old Potomac residence...

Merrill Amour, who was assistant chief engineer in CAP's safety offices until Jan. 1, is thriving as Washington counsel and assistant general manager of Aircraft Owners & Pilots Assn. here.

French lesser Mortier (I know, if you must know) Richardson has assigned from ATA to Los Angeles. Future plans are indefinite. Recent election of Ramon Mortier, Washington correspondent of Knight newspapers, as president of the National Press Club marked the second time in three years that a member of *Americana* Wines' Assn. has won the top spot of the country's biggest press club. WALTER FINCH, Los Angeles Times correspondent here, was the first.

Maj. Gen. Arthur G. Jr., who once took a state-chamber test "hop" with Av. World's Al McAdoo out at Wright Field, is moving to Ft. Worth from his post as commander of the Airforce MATS division at Weeksville AFB. He becomes deputy commander of Maj. Gen. Roger Ramey's 8th Air Force. And friends say it will be long till the word "deputy" is removed.

CHUCK CLARKSON, British civil air attaché, who works hard for the poor people here and is well liked, is about to get delivery on a dc-10000 transatlantic Davis, for use at the British Embassy in Washington and, by sheer coincidence, to show in *Americana* what our country is coming out in the way of small aerospace aircraft.

Introducing sightseeing on the New York area heliports can be a two-hitter CAB chairman, L. Welsh Fagan and James M. Lawlor, are opposing strategies in the case for the two continuations.

Now it's the *Gas Plan*. AvIA's press chief here, Bear Gross, is promoting it mostly at regional gatherings. We think it would cut congressional debate, and bring results. The plan: Take up a collection among U.S. aircraft engineers, buy a new Rutan Canoe (you would increase travel), and deliver it intact to the Rumanian Photo, we'll have a jet transport prototype built out of the hoper by Easter.

End Ward was in town this week. He is an aviation consultant for the Rockefellers interests, but usually also a quantity of his time as a director of Cornell University. Fred Neely, a former belief pillar of aeronautical aviation writing, is doing a small stint of *Southern* strike strikes for the Washington Star on major aviation issues and developments.

It's a baby girl in the *Cactus* Scott Hammer. Mrs. H. says with two boys already, she had to order a girl this time. She couldn't go through the cowboy stage again. Scott is a PR specialist at ECA here.

The celebrated Capt. F. V. H. Wren will get a huffy sheet of newspapering. The retired Navy officer and founder of Wren's Systems of Niagara left the other day for London on PAA, starting a trip around the world to study the aviation business everywhere. And ADMA's latest bulletin says between London and Australia he will navigate a plane being flown there for delivery by his son, Lt. Cmdr. George T. Wren, USN. Son George is "taking the long way home" from a tour of duty with the RFA in London.

Crazy Vice Admiral John M. (Black Jack) Reeves, Jr., has another job strapped on for him, we hear. He'll leave May 1 at least of Naval Air Training. Then the dope in will be readily remedied to become Navy Inspector General! If we can believe the Navy would say that Army type! If the百姓 believe he used to run Naval Air Transport Service is my idea we would guess the Navy is as for some new efficiency.

J. Malcolm Smith has taken over here as United Air Lines' executive assistant, succeeding Tom Davis, who moved into the Comptroller Dept. as assistant secretary.

R. H. W.

# WHAT'S NEW

## New Books

"The Aerospace Directory of British Aviation—1959" is a complete guide to British and Dominion aviation. It lists factories, organizations, societies, manufacturers, flying clubs, societies, and airports.

The volume also is a who's who and what's who of British aviation, containing a biographical section describing over 1300 personalities.

Published by Twyford Press, Ltd., Bunting Green Lane, London, E. C. 1. 374 pages, price 10/6d.

"Av. Propulsion—Turboprops," by Volney C. French, professor, Stanford University, is a companion volume to the author's, "Av. Propulsion—Turbines."

Completely illustrated, the book treats development, design, construction, operation, and evaluation of the turboprop, and is aimed for students. Contained are applications of this type power plant in wide-area military and major of less than 1000 m.

Included are chapters on gas turbine blade path, turbine blade ring analysis, turbine disk design and stress analysis, fluid dynamics of compressors, and design of axial flow and centrifugal-flow compressors.

Published by The National Press, 271 Broadway, Midtown Calif., approximately 380 pages, price \$5.

"Making Aerospace Projects" by Louis J. Korn gives practical procedures for writing money out of pots when Start-ups and inventors of aerospace inventions are attacked. The book describes practical ideas and also those that are not, how to offer an invention to a manufacturer, how to offer your ideas to your employer, how to finance your own ideas, how to put a product, advertising and sell your product, and how to protect your invention.

Published by Whittlesey House, 339 West 42d St., New York 18, N. Y., price \$2.95.

"Writing the Technical Report" by J. R. Nelson, professor emeritus, College of Engineering, University of Michigan. Contains step-by-step procedures for compiling a sensible and clear technical report, from how to choose the type of report to choosing the best form and style, organizing material, use of figures, tables and annotations.

Published by McGraw-Hill Book Co., Inc., 150 W. 42d St., New York 18, N. Y., 168 pages, price \$1.10.

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Just and New edition of

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## Washington Round-Up

## Symington Leaking Afield

Inner circles of the Democratic Party consider that Air Secretary Symington is leaking about his life another unnecessary job. The Atomic Energy Commission antagonists, Party men say, might be tempted to try to become a Member themselves to be better fitted for a primary. Politics is being thought of as a possible Symington's future. But Symington has proven time and again that he is a shrewd, smart fighter with a lot to gain in terms of publicity and timing. He has come out on top against tough odds. It is our editorial opinion that retirement will be a long time if he leaves his present post.

## PAA-AOA Case

But guess it that CAB will approve Pan American's application of Amendment One? We don't forget that TWA is headquartered in Missouri. We hope the Twa man will play the deal if TWA can be pulled. This argument is bolstered by close observers who say TWA didn't fight the case nearly as hard as expected. Their report words are clearest: PAA would have Clark Clifford, until recently one of the President's top aides. That's not quite it. But Twa man probably will hand Clifford the next job of working out a deal that both PAA and TWA will accept. Twa man will approve any reasonable agreement, it is said.

## Whitney &amp; Davis

C. V. Whitney, Undersecretary of Commerce, is threatening retirement in aviation and wills power like took over the membership of Air Coordinating Committee formerly held by John Ahern, Assistant Secretary. However, the new Assistant Secretary, Tim Davis, inherited Ahern's NACA chair and was sworn in last week. Davis has been handed routine matters for Alfred Wetmore in addition to his air duties.

## Peep-Holes in the Iron Curtain

Detonation of U.S.-Bulgaria relations has shut off one of the two best sources of information about aviation and other activities behind the Iron Curtain. Washington informs us. One other important channel is still functioning—but in low gear, as we know here.

## Greatly Exaggerated

Walter Winchell proclaimed the imminent end of the B-52 program on an otherwise quiet Sunday evening. He based his information on the New York Times. Winchell's stock went up a day last but it goes when all relevant reports indicated the B-52's death was greatly exaggerated. Industry people have known Winchell's got a way to say the B-52 for "intercontinental bombers" will be out of bed, and down a hasty machine. All the evidence says that with even the most gullible the B-52 will stay in the picture indefinitely.

## Hard-Boiled Auditors

Even duels of Aircraft Industries Association are meeting in for service of auditors to the military services. Navy accountants in the New York area are questioning whether the full amount of one defense company's payments to

the trade association can be considered as allowable cost. They concerned is that one case in 7918. Auditing officials say government account contracts specifically state that costs of private activities cannot be allowed, yet the association is believed to conduct some such activities. Therefore, should some percentage of the firm's dues to the association be disallowable?

## Aiken Leaving Washington

Than seems little doubt that Paul Aiken, sound amateur meteorologist general, will leave Washington soon to start reading political lemons in Kansas. Although Kansas hasn't elected a Democratic senator in a man's age, Mr. Aiken apparently believes he can ride in this truck on the east side of the Missouri pines. Few in aviation will be sorry to see him leave. He has been an obstruction to things aviation.

## Johnson Still Entrenched

Defense Secretary Johnson has made powerful enemies, especially on Capitol Hill, but there is no evidence that he is still not firmly entrenched with Harry Truman and Democratic leaders. We would dissent, however, to the contrary.

## Shadow of Coming Events?

Reaction approved by CAB of a 60 day charter deal between Pan American and National sterles the airline industry. NAL, too, says its agreement on PAA airlines which otherwise would be double-billing between New York and PAA's maintenance base in Miami. These are milestones, as pointed out in the story on NAL elsewhere in this issue of AVIATOR WEEK. But some industry staples were mentioned. They point out that this gives NAL Statocaster "overnight," that it is bound to NAL's maintenance as their everyday passengers double their flights. That Statocaster obviously will make the run faster than Eastern's Concorde, and that the whole affair will make it easier for CAB to approve the long-contested PAA-NAL interchange application. CAB people say themselves, and that the happens can be moved even more of the cost of deadheading flight, while saving the public billions, then who can complain?

## Railroad Lobbying—and Air

Announcement of American Railroads' reports under the lobbying law that it spent \$194,000 in 1949. Only five other organizations spent more.

According to Congressional Quarterly News, Federal report, published in the Congressional Record, the Transportation Association of America received \$571,000 last year and spent \$109,000. National Federation of American Shippers allocated \$54,000.

Aerospace Industries Association stated it did not believe its activities fell within the scope of the lobbying law. Its annual expenditure \$584,551 in 1949. "Expenditure for purposes which may be attributable to lobbying included \$12,666 to IBM & Knolls, Inc., for relay of Bert C. Goss, unrelated public relations director, \$13,607."

At Transport AIA, filing under protest, listed expenditure of \$15,554 for expenses possibly connected to lobbying.

Robert H. Wood

**New**  
**ADVANCED H-5**  
**GYRO-HORIZON**



**READY FOR TAKE-OFF IN 30 SECONDS**



The new Sperry H-5 Gyro-Horizon features the fastest gyro rotation drive yet developed to help transports reduce ground time and gain flying time. The initial rotation cycle is completed in 30 seconds after the main switch is turned on... permitting immediate take-off. This advanced aircraft gyro provides surface take-off reliability by thus expediting take-offs, saving valuable time on routine stops and turnarounds.

The reaction device which makes this possible operates in conjunction with a small remote power control unit. Other design changes feature latest developments for increased reliability and longer service life. Improved float with larger maximum aerofoil moments angle of

attack 40%... giving the pilot clearer visibility, easier and more accurate readings of bank and pitch.

When the Gyro-Horizon is paired with the Sperry Gyro-Compass, the pilot gets attitude and directional indications to one-half degree. Result... precise attitude and directional control regardless of visibility.

**OTHER FEATURES OF THE H-5.** Nose landing... no cage devices needed. Freedom of roll through 360 degrees. Gyro won't tumble even during a complete loop.

This new Gyro-Horizon is another example of Sperry's advanced research and engineering used to today's advanced aviation service. Our Aerospace Department will be glad to supply complete information.

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*Self-Locking  
Cap Nuts*, Deep Screw-Thread Penetration  
**OFFERS GREATER  
PRODUCTION-LINE FLEXIBILITY**



*—the Red Elastic Collar effectively seals  
against liquid and gas pressures...assures REUSEABILITY!*

Again, ESNA has met the demand of airframe and component manufacturers—providing an extra high, light weight, all-metal cap, for the ESNA hex and anchor nut types shown above, with sufficient cap height to insure full clearance for AN-3 and AN-4 bolts or AN-509 screws.

The extra height of this new ESNA design offers greater flexibility for production line use due to the depth of screw-thread penetration it permits. This means a single screw length may be specified—to join sections with permissible variations in thickness equal to the extra height of the new ESNA K3 Cap Nut. Simplification in purchasing and assembly call-outs result.

Another design feature of great importance is the pressure seal formed by the famous Red

Elastic Collar and the new cap. ESNA manufacturing specifications require that all type K3 Cap Nuts withstand external or internal liquid and gas pressures of 80 PSI minimum... without leakage.

And, like all Elastic Stop Nuts, the new ESNA K3's provide dependable protection against vibration... do not damage bolt threads... and maintain precise adjustments, even after repeated re-use.

**HERE'S A CHALLENGE:** Send us complete details of your toughest bolted trouble spot. We'll supply test nuts—FREE, in experimental quantities. Or, for dimensional data sheet on the K3 line, write: Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in many principal cities.



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